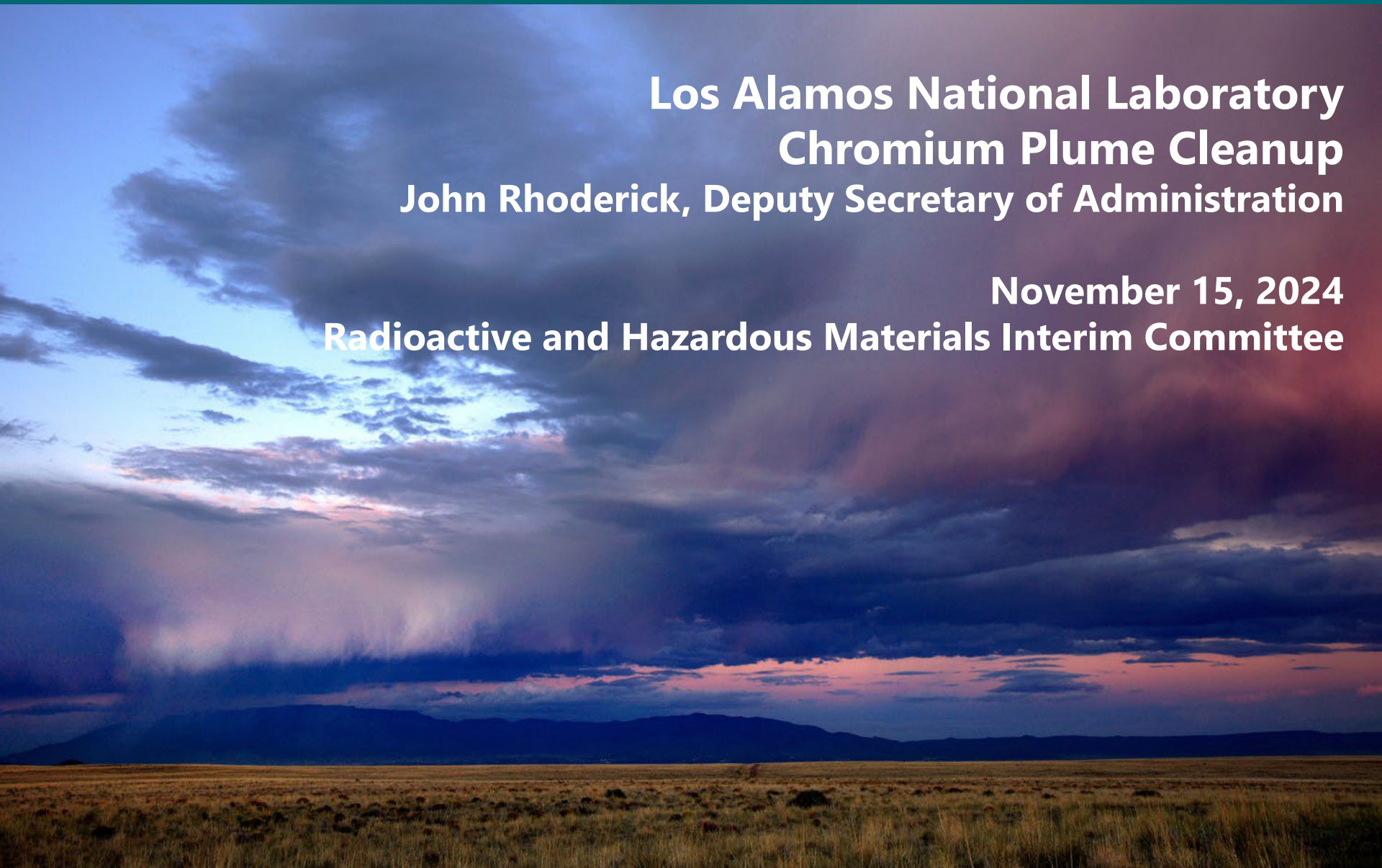
New Mexico Environment Department



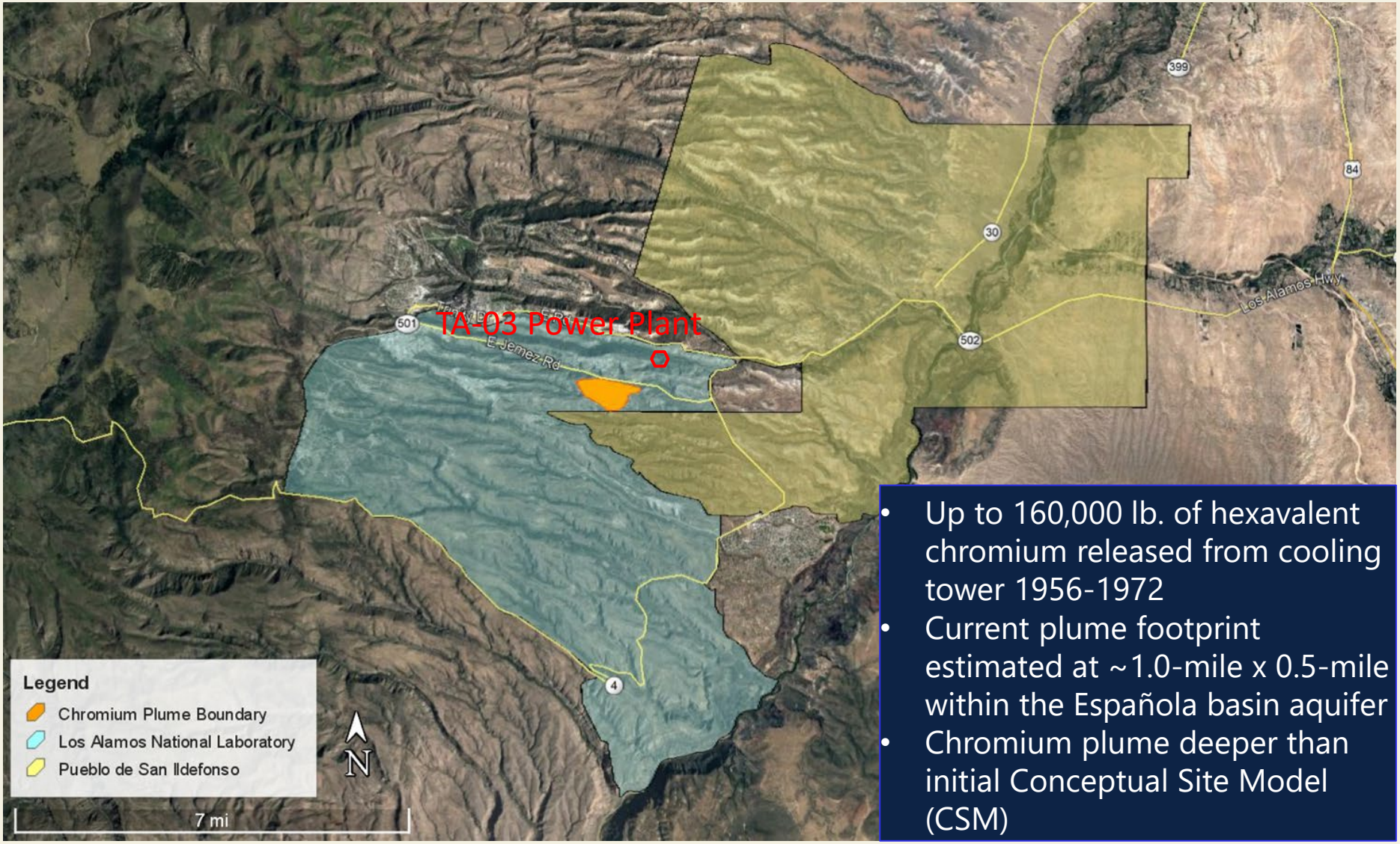
Los Alamos National Laboratory
Chromium Plume Cleanup

John Rhoderick, Deputy Secretary of Administration

November 15, 2024

Radioactive and Hazardous Materials Interim Committee

Chromium Plume



- Up to 160,000 lb. of hexavalent chromium released from cooling tower 1956-1972
- Current plume footprint estimated at ~1.0-mile x 0.5-mile within the Española basin aquifer
- Chromium plume deeper than initial Conceptual Site Model (CSM)

Brief History

- First discovered in 2005 during site-wide investigation of the groundwater beneath LANL
- Interim measures (IM) pump-and-treat system was installed in 2016
- NMED first brought up concerns with increasing chromium trends downgradient of the injection wells in 2021
- GWQB issued a Notice of Violation for the exceedances in 2022
  - DOE did not propose action that would prevent further migration of the plume in the response
  - NMED required cessation of injection by April 2023

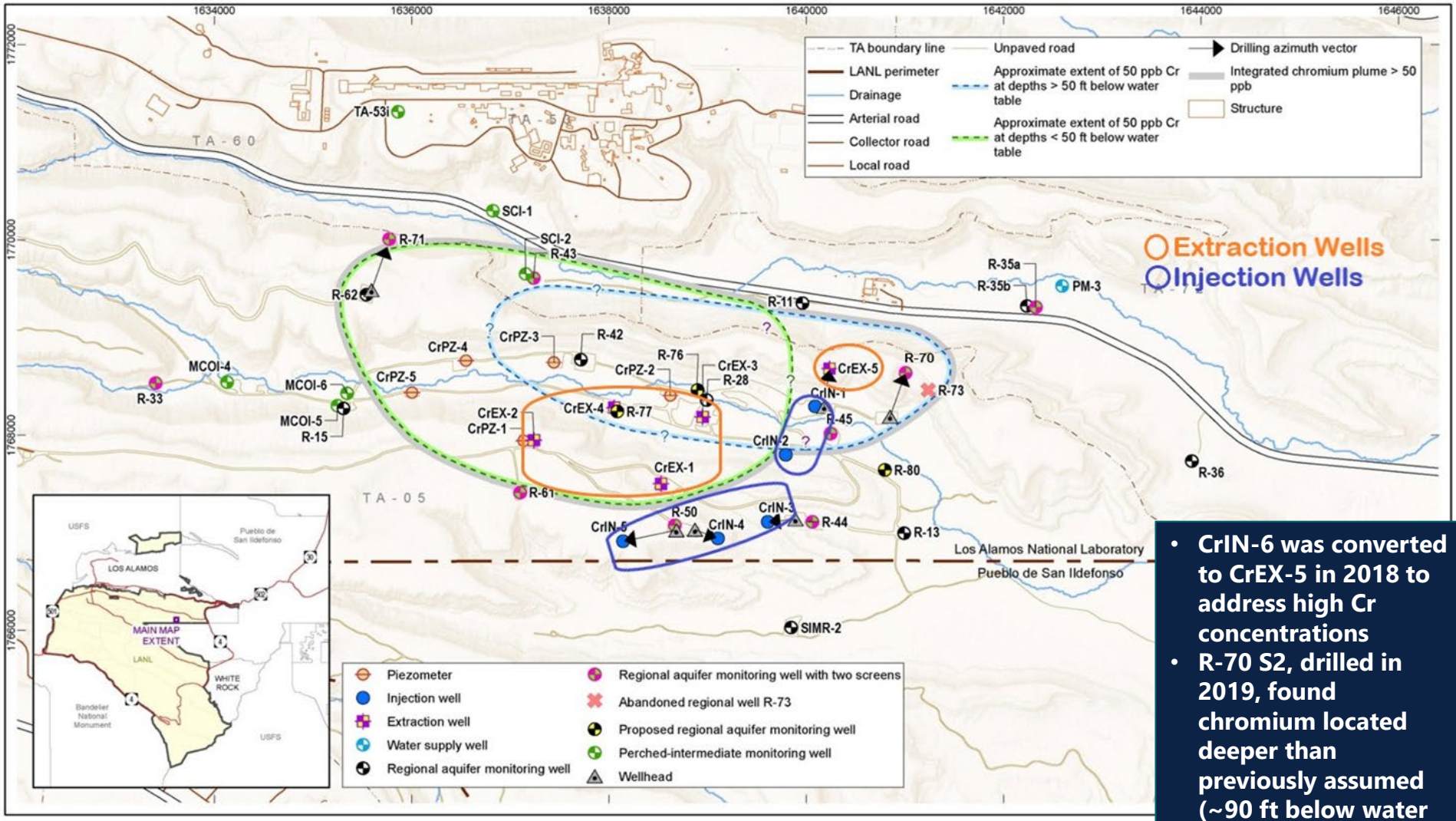
Current Status

- To resolve technical disagreement between NMED and DOE, an independent review team was convened
  - Technical experts from DOE, EPA and academia were mutually selected
  - Conducted a site visit and began review of information in March 2024
- Draft document with recommendations were received by NMED and DOE in September 2024
  - Currently in review by all parties, including Pueblo de San Ildefonso and New Mexico Office of the State Engineer
  - Parties are reviewing for factual accuracy only
  - Recommendations will be used to inform a path forward for the IM and achieve compliance with regulatory direction

Current Status

- NMED issued a temporary authorization to resume partial operations of the IM in June 2024
  - DOE restarted treatment of the chromium plume on September 30, 2024
  - Currently using 3 injection wells on the south end of the plume
- NMED and DOE finalized the revisions to the LANL Consent Order in September 2024
  - Satisfies the 2021 complaint filed by NMED
  - Includes a Settlement Agreement and modified Consent Order

Chromium Plume Treatment System



- **CrIN-6 was converted to CrEX-5 in 2018 to address high Cr concentrations**
- **R-70 S2, drilled in 2019, found chromium located deeper than previously assumed (~90 ft below water table)**

Chromium Workplan

- DOE submitted the Chromium Interim Measures and Characterization Workplan (Workplan) in September 2022 per the requirements of the 2016 Consent Order
  - Worked together with DOE to identify characterization activities necessary to move towards final remedy
- NMED issued Notice of Disapproval (NOD) for the Workplan
  - We agreed with extraction, but required alternative location(s) for injection outside the plume contamination boundary
  - Goal is to move to the determination of a final remedy after completing data gaps in the Workplan

Groundwater Permit

- NMED issued a groundwater permit on August 31, 2016 (Permit number: DP-1835)
- It covers five injection wells in the chromium plume area
  - Treated in ion exchange to meet groundwater concentration limits
- Requires monitoring 8 down-gradient wells for changes in plume dynamics
- Data from late 2020 showed concentrations (55 ppb) **exceeding** state standards at deeper levels in a down-gradient well
  - Higher concentrations (up to 70 ppb) have been observed in this well screen

DP-1835 Notice of Violation

- NMED issued DOE a Notice of Non-Compliance for the exceedances in April 2022
- DOE refuted non-compliance in May 2022 and stated they would proceed with injection
- NMED then issued a Notice of Violation in June 2022 requiring a corrective action plan
  - Utilizing civil penalties with failure to comply
- DOE complied and submitted an Action Plan in September 2022
  - Proposed a process for modeling the impacts of injecting water at the leading edge of the plume and proposed installing two additional down-gradient monitoring wells

Notice to Cease Injection

- GWQB issued a response in December 2022
- Stated that the proposed actions were acceptable, but had deficiencies
  - Did not identify actions to control the cause of migration or action to prevent further migration
- NMED required DOE cease injecting into all wells associated with DP-1835 by April 1, 2023
  - Until completion of proposed corrective actions
  - Until DOE can definitively prove further migration is not occurring
- March 31, 2023: DOE ceased injection into the groundwater wells associated with DP-1835 and shuts down extraction and treatment as well.

NMED Partial Operation Concession

- After the RHMC meeting held on August 14, 2023, DOE shared concerns regarding increases in percentage of chromium concentration since the IM shut down for the first time
- To alleviate concerns with increasing concentration trends, NMED sent a letter on September 6, 2023 that proposed acceptable corrective actions that would allow for partial restart of the IM
  - One-year recommencement with the following actions proposed in a Corrective Action Plan
    - DOE must install an alternative disposal location for the treated water outside the boundary of the plume that can dispose of the full volume of water extracted
    - Install SIMR-3, a monitoring well on Pueblo de San Ildefonso land
    - Install previously proposed characterization well R-80
  - Would allow for temporary operation while protective measures are implemented that satisfy NMED concerns

IM Resumption Correspondence

- DOE responded in a letter dated December 5, 2023
  - Agreed to participate in an Independent Technical Review to provide insight on the impasse
  - Did not agree with NMED's offer and the conditions for partial operation
  - Requested NMED approval to resume partial operation of the IM during the Independent Technical Review
- NMED responded on February 6, 2024 proposing another compromise
  - Discussed that DOE action is needed prior to the completion of the mutually agreed upon independent review
  - Revised the proposed Acceptable Corrective Actions to facilitate easier implementation with an alternative injection well to dispose of the capacity of two extraction wells

IM Resumption Correspondence

- DOE responded to the 2nd concession for partial operation on April 10, 2024
  - Stated that the requirements by NMED were arbitrary conditions without scientific basis
  - Does not agree to comply with regulatory direction or to the conditions proposed by NMED
  - Again, requests approval to resume IM operation during the expert review
- NMED ended the impasse on May 29, 2024 by allowing temporary authorization for partial operations
  - Potential risks to groundwater safety and contamination risks to Pueblo de San Ildefonso outweighed the lack of action by DOE
  - Allowed operation of 3 injection wells to restart treatment of contaminated water

Current Assessment

- DOE restarted partial operations on September 30, 2024
  - NMED has still not received any communication regarding our regulatory direction to expand the treatment system
- Necessitates the start of discussions between NMED and DOE on the future of the chromium plume treatment system
  - Encourages improved communication from DOE that demonstrates professional respect
- After the conclusion of the Independent Technical Review, NMED intends on pursuing compliance with regulatory requirements

Draft Independent Review

- Independent Technical Review team provided a draft report on September 18, 2024
  - NMED and DOE were provided an opportunity to comment on the factual accuracy of the statements in the draft report
  - Includes recommendations on each of the questions posed to the review panel
- Key Recommendations included:
  - Support for restarting the interim measures treatment in a limited capacity
    - Supported no injection in the eastern area, which is the area that caused concerns for NMED beginning in 2020
  - Recommended expanding the interim measures with an alternative high-volume capacity injection well
  - Discussed the need to convert the current groundwater model into the industry-standard program available to NMED and the public

Thank You!